

SERVICE REPAIR

MANUAL

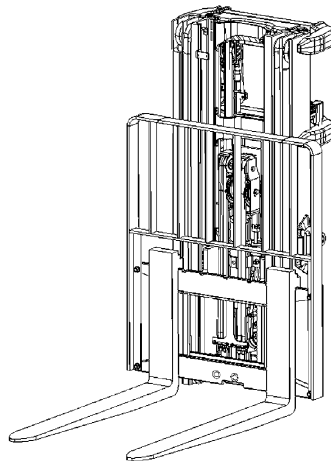
Hyster F001 (H1.6FT H1.8FT H2.0FTS Europe) Forklift

HYSTER

MAST REPAIRS

2, 3, AND 4-STAGE MASTS

**S30FT, S35FT, S40FTS [E010];
H1.6FT, H1.8FT, H2.0FTS
(H30FT, H35FT, H40FTS) [F001];
S2.0-3.5FT (S40-70FT, S55FTS) [F187];
H2.0-3.5FT (H40-70FT) [L177]; E1.50-2.00XM (E25-35Z,
E40ZS) [E114/F114]; J1.60-2.00XMT (J30-
40ZT) [J160]; J2.0-3.20XM (J40-65Z) [B416];
E2.00-3.20XM (E45-65Z) [G108]**



HYSTER

SAFETY PRECAUTIONS

MAINTENANCE AND REPAIR

- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- DISCONNECT THE BATTERY CONNECTOR before doing any maintenance or repair on electric lift trucks. Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT TRUCK ON BLOCKS in the **Operating Manual** or the **Periodic Maintenance** section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use **HYSTER APPROVED** parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a DO NOT OPERATE tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the **WARNING** and **CAUTION** notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

NOTE: The following symbols and words indicate safety information in this manual:



WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.

On the lift truck, the WARNING symbol and word are on orange background. The CAUTION symbol and word are on yellow background.

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manual**

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This section is for the following models:

S30FT, S35FT, S40FTS [E010];
H1.6FT, H1.8FT, H2.0FTS (H30FT, H35FT, H40FTS) [F001];
S2.0-3.5FT (S40-70FT, S55FTS) [F187];
H2.0-3.5FT (H40-70FT) [L177];
E1.50-2.00XM (E25-35Z, E40ZS) [E114/F114];
J1.60-2.00XMT (J30-40ZT) [J160];
J2.0-3.20XM (J40-65Z) [B416];
E2.00-3.20XM (E45-65Z) [G108]

General



WARNING

Before working on or near the mast, see **Safety Procedures When Working Near Mast** in this section.

This section has the repair procedures for the Two-Stage, Limited Free-Lift (LFL); Two-Stage, Full Free-Lift (FFL); Three-Stage, Full Free-Lift (FFL); and Four-Stage, Full Free-Lift (FFL) masts and carriages. Procedures for Carriage Adjustments are located at the end of this section.

NOTE: For models J1.60-2.00XMT (J30-40ZT) [J160], this section applies to only to Four-Stage masts. Refer to **Mast Repairs, 2 and 3-Stage Masts** 4000 SRM 522 for Two-Stage and Three-Stage masts for these particular models.

NOTE: Hoses have a service life that is determined by application and time. Install a new hose if the hose is worn, damaged, soft or hard, and no longer flexible. If necessary, make a comparison to a new hose that is the correct replacement for the hose you are inspecting.

Safety Procedures When Working Near Mast

The following procedures **MUST** be used when inspecting or working near the mast. Additional precautions and procedures can be required when repairing or removing the mast.



WARNING

Mast parts are heavy and can shift. Distances between parts are small. Serious injury or death can result if part of the body is hit by parts of the mast or the carriage.

- **Never put any part of the body into or under the mast or carriage unless all parts are completely lowered or a safety chain is installed. Also make sure that the power is OFF and the key is removed. Put a DO NOT OPERATE tag in the operator's compartment. Disconnect the battery and put a tag or lock on the battery connector.**
- **Be careful of the forks. When the mast is raised, the forks can be at a height to cause an injury.**
- **DO NOT climb on the mast or lift truck at any time. Use a ladder or personnel lift to work on the mast.**
- **Mast repairs require disassembly and removal of parts and can require removal of the mast or carriage. Follow the repair procedures in this section.**

WHEN WORKING NEAR THE MAST ALWAYS:

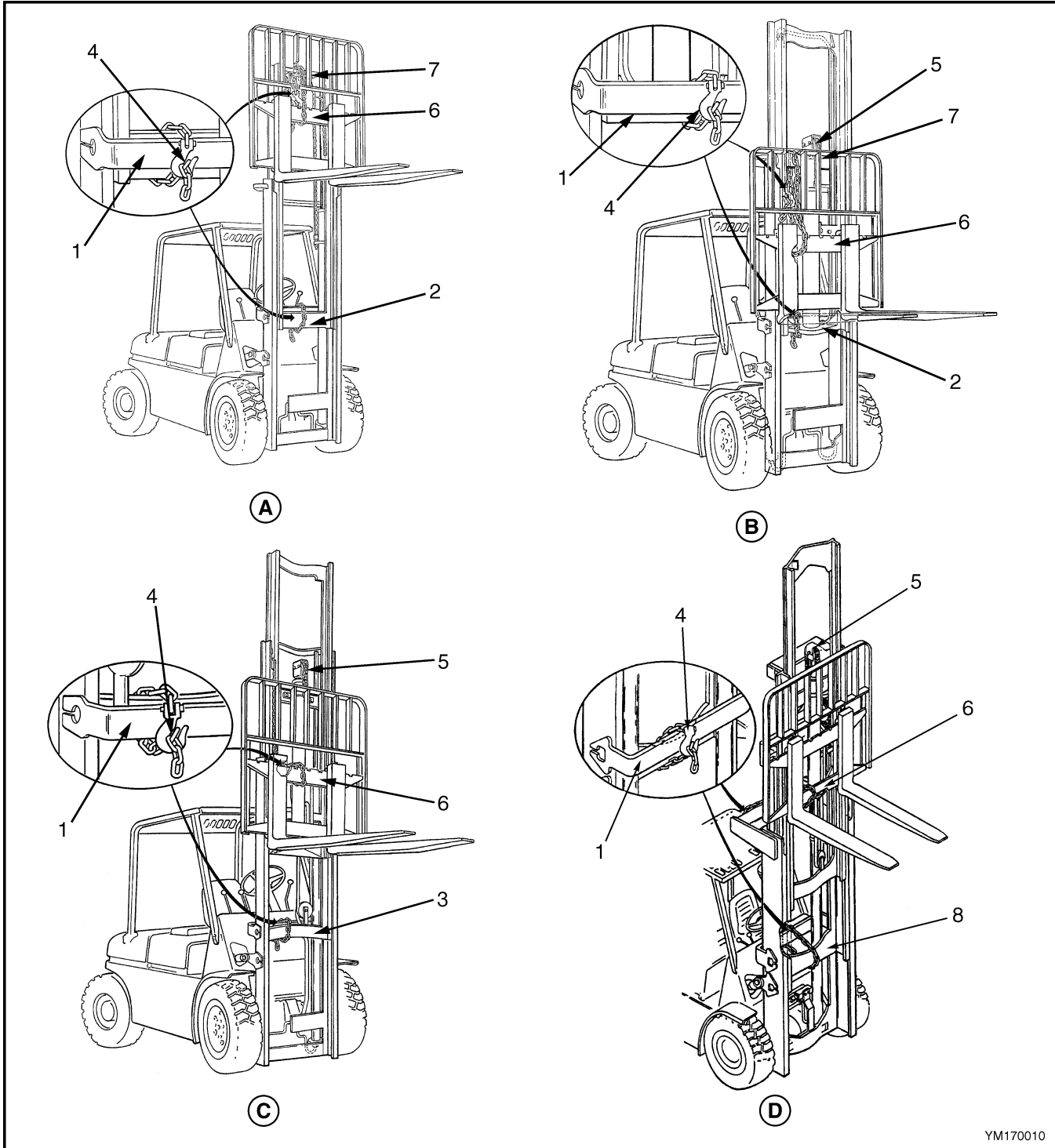
- **Lower the mast and carriage completely: Turn the key switch to the ON position and**

push the lift/lower control lever forward until there is no movement in the mast. Make sure that all parts of the mast that move are fully lowered.

OR

- **If parts of the mast must be in a raised position, install a safety chain to restrain the moving parts of the mast. Connect moving parts to a part that does not move. Follow these procedures:**

1. Put mast in vertical position.
2. Raise mast to align bottom crossmember of mast upright that moves in outer mast with crossmember on outer mast. On the two-stage mast, the moving part is the inner mast. On the three-stage mast, it is the intermediate mast. On the four-stage mast, it is the first intermediate mast. See Figure 1.
3. Use a 3/8-inch minimum safety chain with a hook to fasten the crossmembers together so the movable member cannot lower. Put hook on back side of mast. Make sure hook is completely engaged with a link in the chain. Make sure safety chain does not touch lift chains or chain sheaves, tubes, hoses, fittings, or other parts on the mast.
4. Lower mast until there is tension in safety chain and free-lift cylinder (full free-lift models) is completely retracted.



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Figure 1. Safety Chaining the Mast

Legend for Figure 1

- A. TWO-STAGE LFL MAST
B. TWO-STAGE FFL MAST

1. OUTER MAST
2. INNER MAST
3. INTERMEDIATE MAST
4. HOOK

NOTE: Apply the parking brake. After lowering or restraining the mast, shut off the power, and remove key. Put a **DO NOT OPERATE** tag in the operator's compartment. Disconnect battery and put a tag or lock on battery connector.

- C. THREE-STAGE FFL MAST
D. FOUR-STAGE FFL MAST
5. FREE-LIFT CYLINDER
6. CARRIAGE BAR
7. CROSSMEMBER
8. FIRST INTERMEDIATE MAST

5. Install another safety chain (9.5 mm (3/8 in.) minimum) between the top or bottom bar of the carriage (6) and a crossmember on the outer mast as a secondary safety device. Install a **DO NOT REMOVE** tag on the safety chain(s).

Fork Repair

The forks are held on the carriage by hooks. The forks are kept in position by pins that fit through the top fork hooks and into slots in the top bar carriage. If pin does not remain engaged in carriage slot, replace with new pin. Always check that the pins for the forks keep the forks in position on the carriage. Replace damaged fork pin parts. The forks can be removed from the carriage by aligning the forks with the fork removal notch. The fork removal notch is in the bottom bar of the carriage.

REMOVE



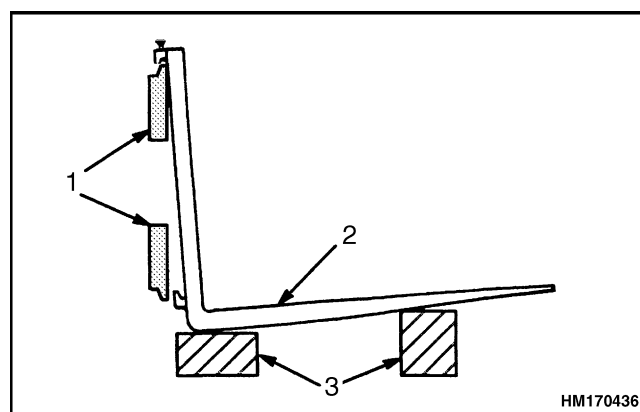
WARNING

DO NOT try to remove a fork without a lifting device. Each hook fork for these lift trucks can weigh 45 to 115 kg (99 to 254 lb).

A fork can be removed from the carriage for replacement of the fork or other maintenance. Slide the fork to the fork removal notch in the bottom bar of the carriage. See Figure 2 and Figure 3. Lower the fork onto blocks so the bottom hook of the fork moves through the fork removal notch. See Figure 3. Lower the carriage further so the top hook of the fork is disengaged from the top carriage bar. Move the carriage away from the fork or use a lifting device to move the fork away from the carriage.

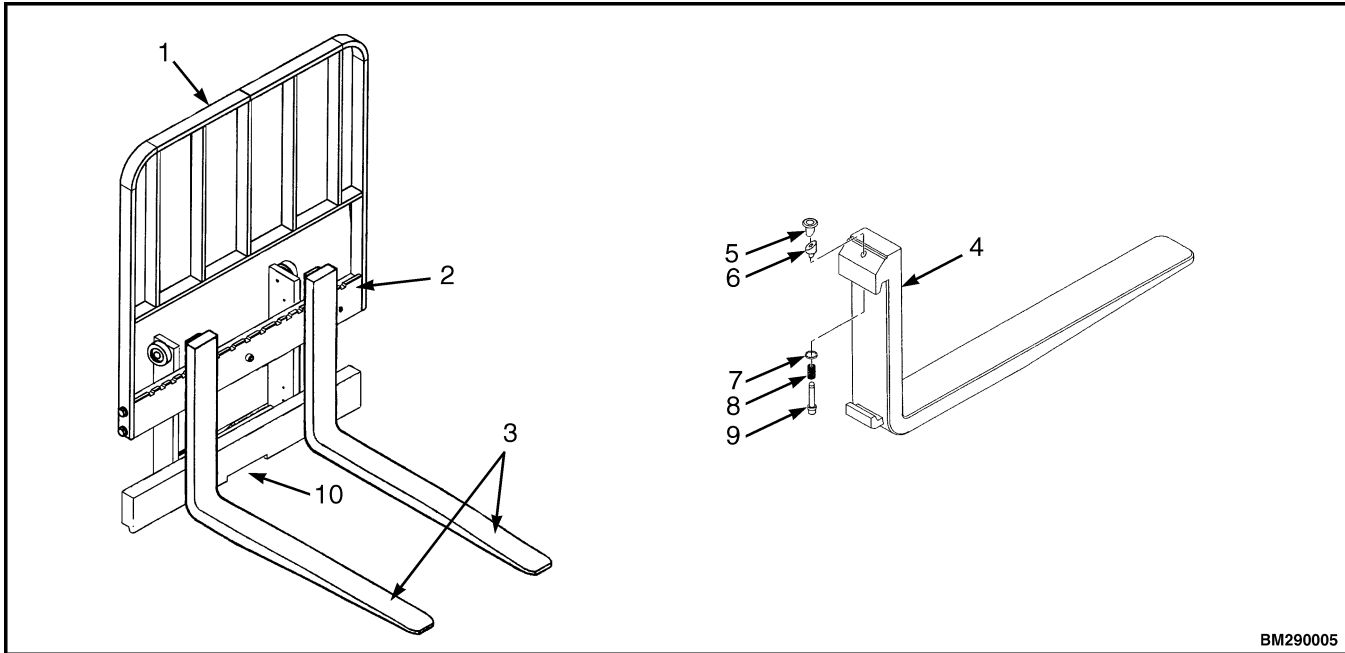
INSTALL

Move the fork and carriage so the top hook on the fork can engage the upper carriage bar. Raise the carriage to move the lower hook through the fork removal notch. Slide the fork on the carriage so both upper and lower hooks engage the carriage bars. Engage the latch pin with a notch in the upper carriage bar.



1. CARRIAGE BARS 3. BLOCKS
2. HOOK FORK

Figure 2. Hook Fork Removal



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- | | |
|---|--|
| <ul style="list-style-type: none"> 1. LOAD BACKREST 2. CARRIAGE 3. FORKS 4. FORK 5. KNOB | <ul style="list-style-type: none"> 6. WEDGE 7. WASHER 8. SPRING 9. PIN 10. FORK REMOVAL NOTCH |
|---|--|

Figure 3. Carriage and Forks

CHECKS

⚠ WARNING

Never repair damaged forks by heating or welding. Forks are made of tempered steel using special procedures. Always replace damaged forks as a pair.

Inspect the forks for cracks and wear. Check the alignment of the fork tips. The difference in height of the fork tips must be less than three percent of the length of the forks. See Table 1 and Figure 4.

Some applications may require closer alignment. If the forks do not meet specification, they both must be replaced. Check that the bottom of each fork is not excessively worn. Check for smooth and proper operation of the fork lock pins. Repair or replace any damaged or broken fork lock pins or components and lubricate, as necessary. See Figure 3.

Table 1. Fork Tip Alignment

Fork Tip Alignment Specifications			
Standard Fork Lengths		Maximum Fork Tip Difference ₁	
mm	(in.)	mm	(in.)
914	(36)	27	(1.08)
1067	(42)	32	(1.26)
1219	(48)	37	(1.44)
1372	(54)	41	(1.62)
1524	(60)	46	(1.80)
1829	(72)	55	(2.16)

₁Difference of alignment between fork tips must be no more than 3% of the total fork length.

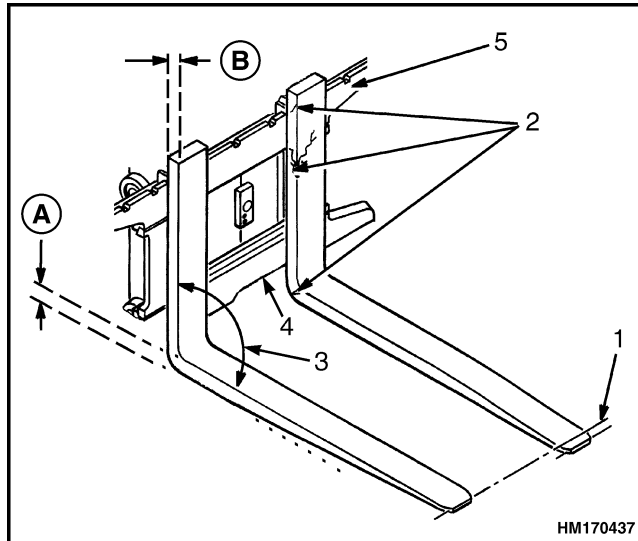


Figure 4. Fork Check

Legend for Figure 4

- A. HEEL OF FORK (MUST BE 90% OF DIMENSION B)
 B. ORIGINAL FORK THICKNESS (DIMENSION B)
1. TIP ALIGNMENT (MUST BE WITHIN 3% OF FORK LENGTH)
 2. CRACKS
 3. MAXIMUM ANGLE 93°
 4. FORK REMOVAL NOTCH
 5. CARRIAGE

Carriages Repair

STANDARD CARRIAGE

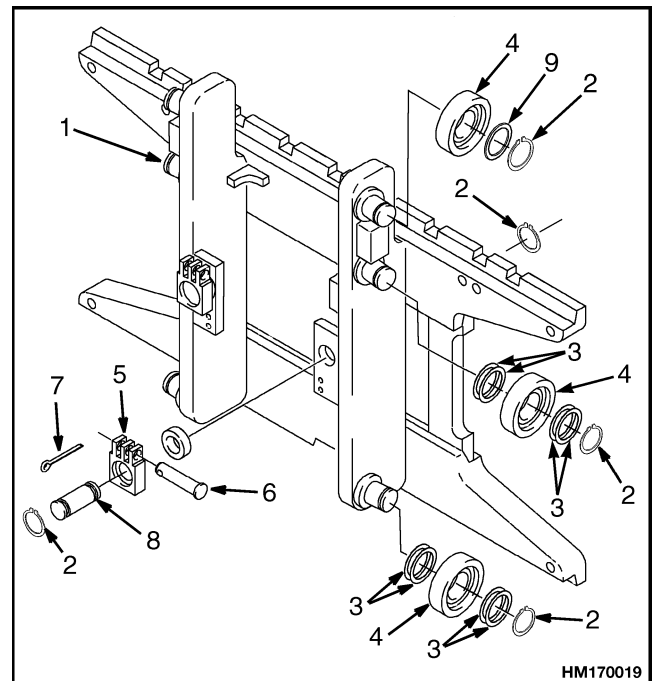
Remove

1. Remove the forks. See Fork Repair.
2. Remove the four capscrews securing the load backrest to the carriage. Remove the load backrest.
3. Connect a lifting device to the carriage. Lift the carriage so that the lift chains become loose.

WARNING

When disconnecting the lift chains, keep control of the ends. Use wire to temporarily connect the ends of the lift chains to the mast. This procedure will prevent the lift chains from falling from the sheaves and causing an injury or damage.

4. Remove the pin from each chain anchor at the carriage. See Figure 5. Disconnect the lift chains from the carriage. Use wire to connect the ends of the lift chains to a part of the mast. Make sure the chains can move freely when the inner mast is raised.



NOTE: TWO-STAGE LFL CARRIAGE SHOWN.

- | | |
|-----------------|---------------|
| 1. CARRIAGE | 6. CHAIN PIN |
| 2. SNAP RING | 7. COTTER PIN |
| 3. SHIM | 8. ANCHOR PIN |
| 4. LOAD ROLLER | 9. SPACER |
| 5. CHAIN ANCHOR | |

Figure 5. Standard Carriage

 **WARNING**

To help prevent possible injury, make sure the carriage is stable when the inner mast is above the load rollers of the carriage.

5. Use the lift cylinders to raise the inner or intermediate mast. If the hydraulic system cannot be used, disconnect the lift cylinders from the inner or intermediate mast. See the section **Cylinder Repair** 2100 SRM 1139. Connect a crane [the capacity of the crane must be at least 681 kg (1501 lb)] to the top of the inner mast. Carefully raise the inner mast until it is above the load rollers of the carriage. Install safety chains to secure the mast in its extended position and disconnect the crane. See Safety Procedures When Working Near Mast.
6. Move the lift truck away from the carriage. Completely lower the inner mast so it cannot move.

Repair

NOTE: The carriage can have four or six load rollers. When the carriage has four load rollers, shims are used behind all of the load rollers. When the carriage has six load rollers, shims are installed on the bottom and middle rollers only.

1. If any of the load rollers must be replaced, make a note of the location and number of the shims. Install the shims, load rollers, and snap rings. See Carriage Adjustments for correct adjustment of the load rollers.

 **WARNING**

Improper welding procedures can damage the structure of the mast or cause incorrect function of the mast. Consult your Hyster® lift truck dealer for more information before welding on the mast.

2. If the carriage bars have any protruding welds or damaged notches, repair by grinding, filing, or welding.

Install

1. Use the hydraulic system of the lift truck or a crane to raise the inner mast. If the hydraulic system cannot be used, disconnect the lift cylinders from the inner or intermediate mast. See the section **Cylinder Repair** 2100 SRM 1139. Connect a crane [the capacity of the crane must be at least 681 kg (1501 lb)] to the top of the inner mast. Carefully raise the inner mast until it is above the load rollers of the carriage. Install safety chains to secure the mast in its extended position and disconnect the crane. See Safety Procedures When Working Near Mast.
2. Move the lift truck toward the carriage until the inner mast is aligned with the carriage rollers. If the inner mast has been raised and secured using a crane and safety chains, connect the crane, raise the inner mast, and remove the safety chains. Carefully lower the inner mast until it engages all of the load rollers. Disconnect the crane, if attached, and reconnect the lift cylinders. See the section **Cylinder Repair** 2100 SRM 1139.
3. Check the clearance of the load rollers. See Carriage Adjustments in this section.

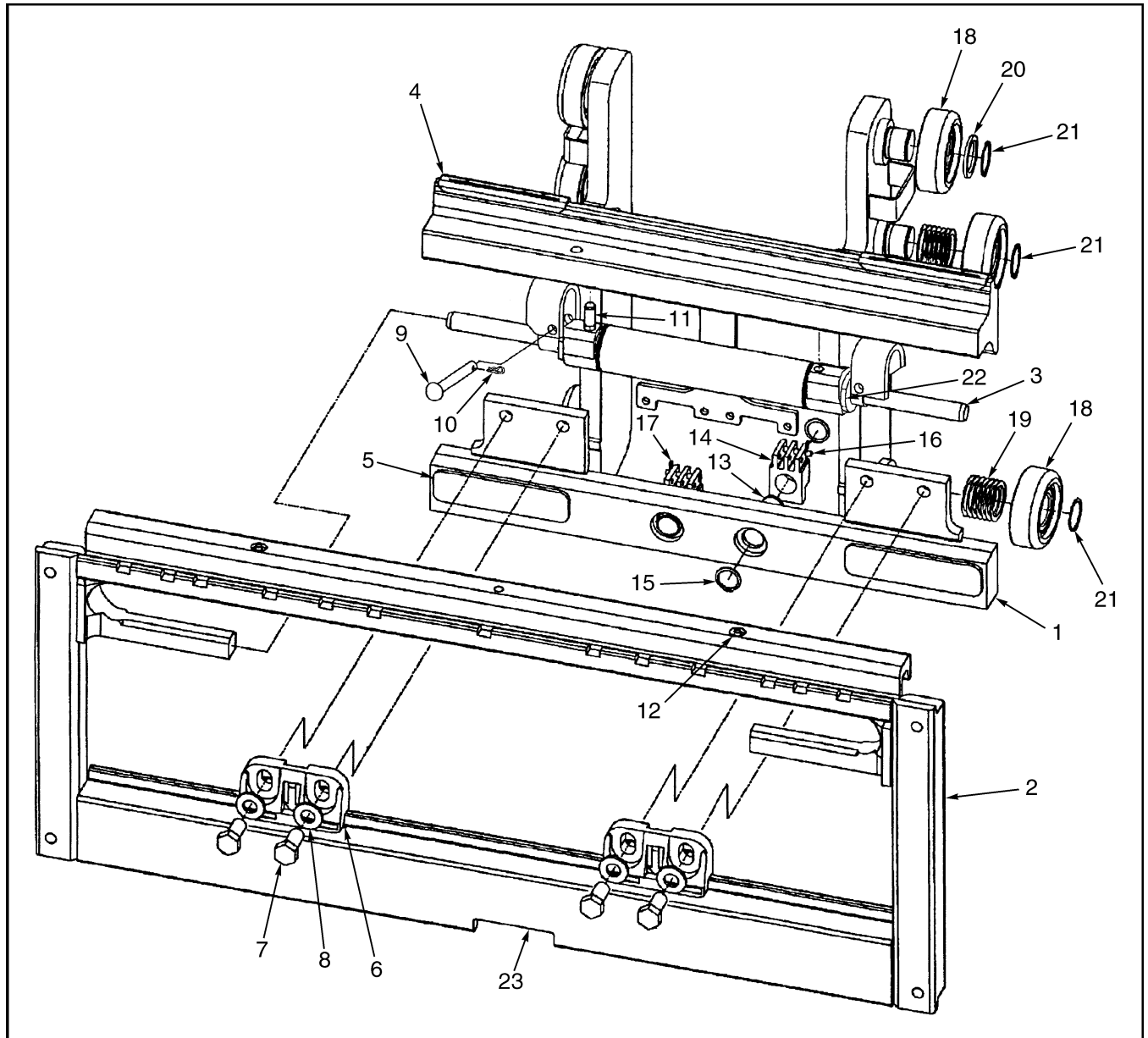
NOTE: Use new cotter pins each time the anchor pins are removed.

4. Connect the lift chains to the chain anchors at the carriage. Install the cotter pins in the anchor pins. Adjust the lift chains as described in Carriage Adjustments in this section.
5. Install the backrest on the carriage. Tighten the capscrews to 195 N•m (144 lbf ft).
6. Install the forks. See Fork Repair.

INTEGRAL SIDESHIFT CARRIAGE

Remove

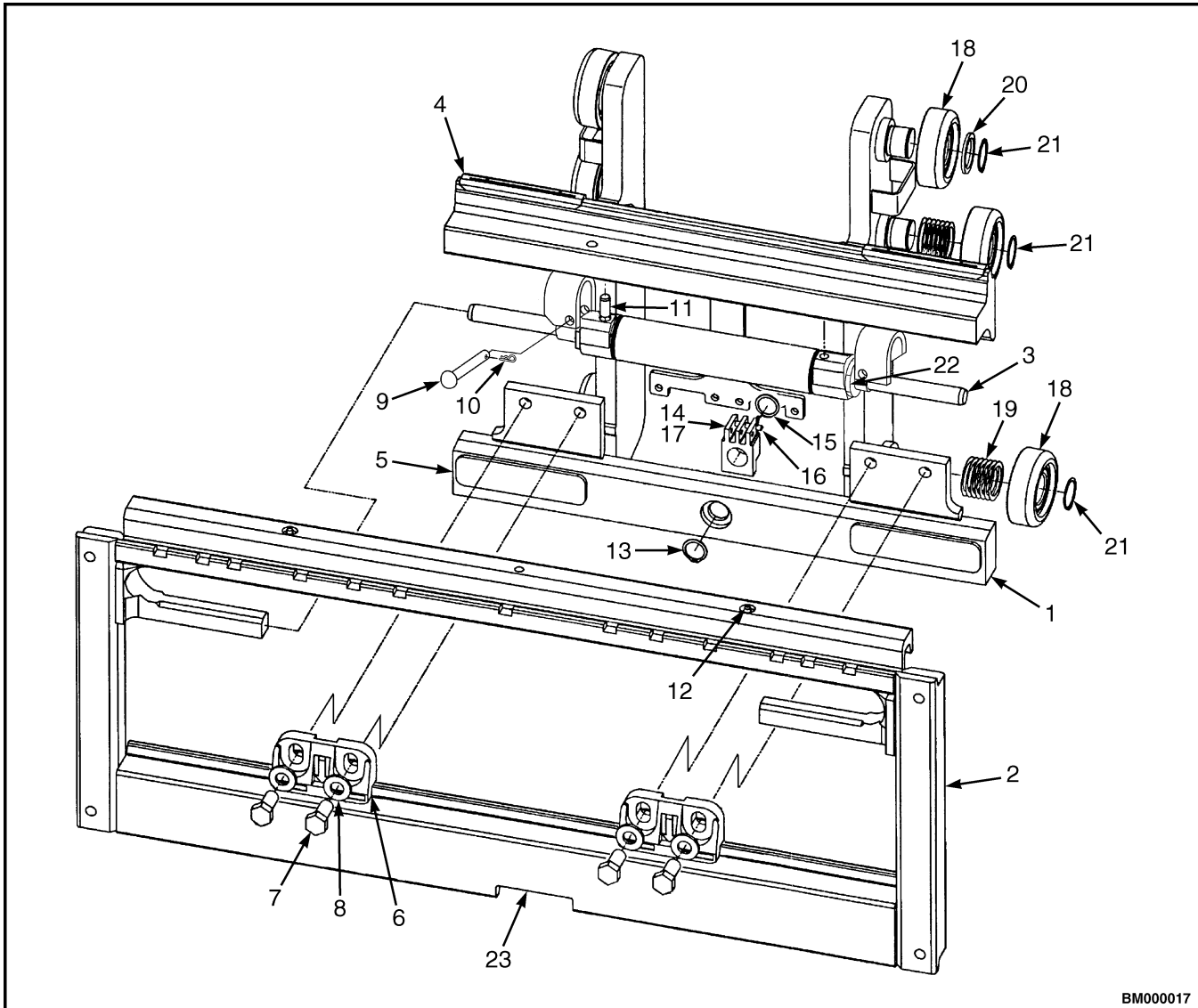
1. Lower the carriage completely. Remove the forks and the load backrest extension. See Fork Repair and Figure 6 or Figure 7.



NOTE: TWO- AND THREE-STAGE FFL IS SHOWN.

- | | |
|-----------------------|------------------------|
| 1. INNER CARRIAGE | 13. PIN |
| 2. OUTER FRAME | 14. CHAIN ANCHOR |
| 3. SIDESHIFT CYLINDER | 15. SNAP RING |
| 4. UPPER BEARING | 16. PIN |
| 5. LOWER BEARING | 17. COTTER PIN |
| 6. LOWER HOOK | 18. LOAD ROLLER |
| 7. CAPSCREW | 19. SHIMS |
| 8. WASHER | 20. SPACER |
| 9. CLEVIS PIN | 21. SNAP RING |
| 10. HAIRPIN | 22. SPACER |
| 11. PIN | 23. FORK REMOVAL NOTCH |
| 12. LUBE FITTING | |

Figure 6. Integral Sideshift Carriage for Lift Truck Models S2.0-3.5FT (S40-70FT, S55FTS) (F187); H2.0-3.5FT (H40-70FT) (L177); J2.00-3.20XM (J40-65Z) (B416); and E2.00-3.20XM (E45-65Z) (G108)



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NOTE: TWO- AND THREE-STAGE FFL IS SHOWN.

- | | |
|-----------------------|------------------------|
| 1. INNER CARRIAGE | 13. PIN |
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| 8. WASHER | 20. SPACER |
| 9. CLEVIS PIN | 21. SNAP RING |
| 10. HAIRPIN | 22. SPACER |
| 11. PIN | 23. FORK REMOVAL NOTCH |
| 12. LUBE FITTING | |

Figure 7. Integral Sideshift Carriage for Lift Truck Models S30FT, S35FT, S40FTS (E010); E1.50-2.00XM (E25-35Z, E40ZS) (E114/F114); J1.60-2.00XMT (J30-40ZT) (J160); and H1.6FT, H1.8FT, H2.0FTS (H30FT, H35FT, H40FTS) (F001)

WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

The hydraulic oil is hot at normal operating temperatures. Be careful when draining the oil.

Never check for leaks by putting hands on hydraulic lines or components under pressure. Hydraulic oil under pressure can be injected into the skin.

CAUTION

Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.

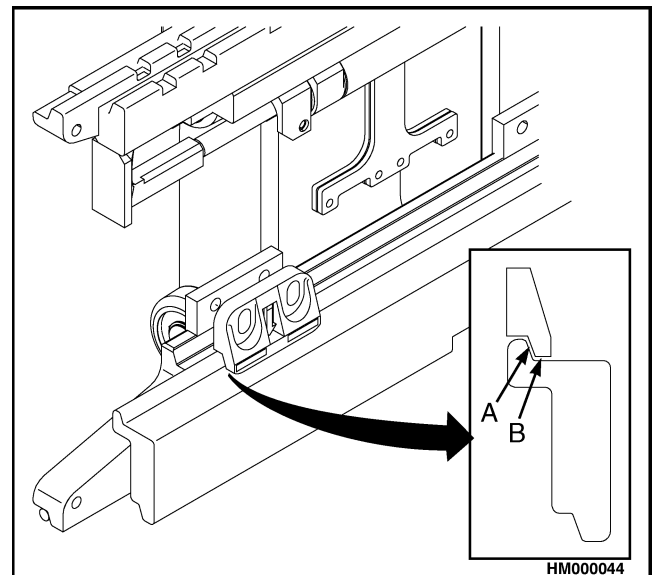
NOTE: Tag hydraulic lines prior to disconnecting to insure correct connection during installation.

2. Disconnect the hydraulic lines at the sideshift cylinder. Put caps on the open hydraulic lines.
3. Remove the lower mounting hooks by removing the four capscrews securing the hooks.
4. Remove two hairpins, two pins, and sideshift cylinder from the carriage. See Figure 6 or Figure 7.
5. Use a crane with a capacity of at least 450 kg (992 lb) to lift the outer frame away from the inner frame. Lay the outer frame flat on a pallet or workbench.

Clean and Inspect

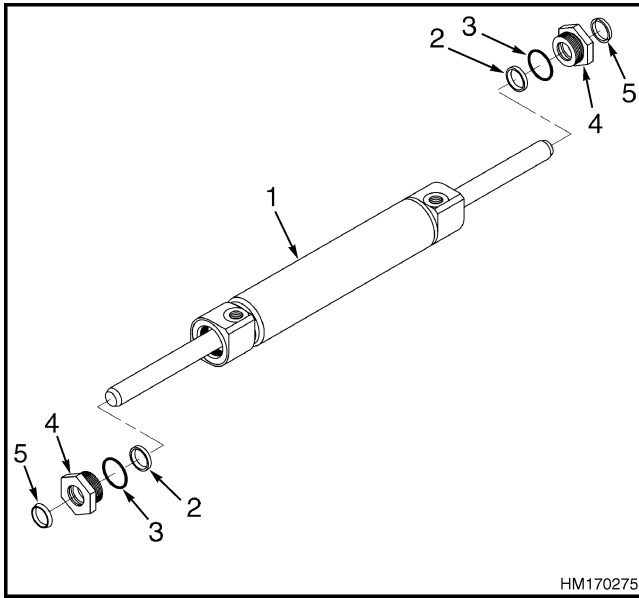
1. Inspect the lower mounting hooks for wear. Replace the hooks if they are worn beyond the wear limit. The wear limit clearance range is 0.76 mm (0.03 in.) minimum and 1.52 mm (0.06 in.) maximum. See A in Figure 8.
2. Clean and inspect the carriage bars for damage and smoothness. Ensure the bars are parallel and the ends are flush.

3. Clean the bearing areas. Inspect the sideshift bearings for wear as follows:
 - a. Remove the upper bearings from the upper apron. If either upper bearing is worn to less than 2.5 mm (0.1 in.) thickness, replace both upper bearings by driving the upper bearings from the upper apron.
 - b. Remove the lower bearings from the lower carriage bar. If either lower bearing is worn to less than 2.5 mm (0.1 in.) thickness, replace both lower bearings by prying the lower bearings from the lower carriage bar.
4. Inspect the sideshift cylinder. Replace the entire cylinder assembly if a cylinder rod is bent or scored or if there is damage on the outside of the cylinder shell that could impair performance or cause leaks under pressure. See Figure 9.



- A. WEAR LIMIT - 0.76 mm (0.03 in.) MINIMUM AND 1.52 mm (0.06 in.) MAXIMUM.
- B. CLEARANCE ADJUSTMENT - 0.76 mm (0.03 in.) MINIMUM AND 1.52 mm (0.06 in.) MAXIMUM.

Figure 8. Lower Mounting Hooks Wear Limit and Clearance Adjustment



- | | |
|---------------------------|-------------|
| 1. CYLINDER SHELL AND ROD | 3. O-RING |
| 2. SEAL | 4. RETAINER |
| | 5. WIPER |

Figure 9. Integral Sideshift Cylinder

Repair

NOTE: Drain the oil from the cylinder before undertaking any repairs.

1. If any of the load rollers must be replaced, make a note of the location and number of the shims. Install the shims, load rollers, and snap rings. See Carriage Adjustments for correct adjustment.

WARNING

Improper welding procedures can damage the structure of the mast or cause incorrect function of the mast. Consult your Hyster lift truck dealer for more information before welding on the mast.

2. If the carriage bars have any protruding welds or damaged notches, repair by grinding, filing, or welding.
3. Replace the cylinder rod seals as follows:
 - a. Clamp one end of the cylinder in a vise between the hydraulic fitting and the retainer on the same end.

- b. Unscrew the retainer from the cylinder. Slide the retainer off the cylinder rod.

- c. Clamp the other end of the cylinder in a vise between the hydraulic fitting and the retainer on the same end.

- d. Unscrew the retainer from the cylinder.

NOTE: If new retainers that are already assembled with seals are being installed, proceed to Step h.

- e. Remove and discard the seals and O-ring from each retainer with a brass O-ring tool. **DO NOT** scratch the grooves.

WARNING

Cleaning solvents may be flammable and toxic and can cause severe skin irritation. When using cleaning solvents, always follow the solvent manufacturer's recommended safety precautions.

- f. Clean the retainers and the cylinder rod with cleaning solvent. Lubricate the new seals and O-rings with hydraulic oil.

- g. Install the seals into the retainer grooves. Form the seals into a "kidney" shape to ease placement into the groove. Note the direction of the rod seals. **Pressure seals are installed with the lip toward the pressure side of the cylinder.**

- h. Apply a film of hydraulic oil to the inside of the retainers.

- i. Clamp one end of the cylinder in a vise between the hydraulic fitting and the end.

- j. Screw the retainer into the cylinder. Tighten the retainer to $325 \pm 30 \text{ N}\cdot\text{m}$ ($240 \pm 25 \text{ lbf ft}$).

- k. Clamp the other end of the cylinder in a vise between the hydraulic fitting and the end.

- l. Slide the retainer onto the cylinder rod. Screw the retainer into the cylinder. Tighten the retainer to $325 \pm 30 \text{ N}\cdot\text{m}$ ($240 \pm 25 \text{ lbf ft}$).

Install

NOTE: Use a wood block or a plastic hammer to fully seat the upper bearings onto the upper carriage bar. Proper lower hook clearance requires the upper bearings be fully seated.

1. If necessary, install the lower sideshift bearings. Then install the upper sideshift bearings. Lubricate the upper and lower sideshift bearings with chassis grease. See Figure 6.

NOTE: The pin, located on the left top of the cylinder looking from the front of the carriage, is for alignment purposes and to prevent the cylinder from rolling to the front or to the back.

2. Install sideshift cylinder onto the carriage with the pin in the up position. Install two pins and two hairpins. See Figure 6 or Figure 7.

3. Use a crane with a capacity of at least 450 kg (992 lb) to install the outer frame on the inner frame.
4. Install the lower mounting hooks using four capscrews. Tighten to $165 \pm 15 \text{ N}\cdot\text{m}$ ($120 \pm 12 \text{ lbf}\cdot\text{ft}$). For proper sideshift operation, make sure there is 0.76 to 1.52 mm (0.03 to 0.06 in.) clearance between the bottom of the hooks and the outer frame. See **B** in Figure 8.
5. Connect the hydraulic lines, as noted during removal, to the sideshift cylinder.
6. Install the backrest on the sideshift carriage. Tighten the capscrews to $195 \text{ N}\cdot\text{m}$ (144 lbf ft).
7. Install the forks.

Mast Repair

MAST, REMOVE



WARNING

The mast is heavy. The mast can weigh approximately 907 kg (2000 lb). Make sure all lifting devices (hoists, cables, chains, slings, etc.) are suitable and of adequate capacity to lift the mast.



CAUTION

Make sure all the mast weldments are fastened together. Make sure the safety chains will not damage the sheaves, tubing, or other parts of the mast.

NOTE: If the mast needs to be disassembled, remove the forks and carriage. If only the lift cylinders need to be removed for repair, the mast does not need to be removed from the lift truck. See the section **Cylinder Repair** 2100 SRM 1139.

NOTE: The length of the lift chains must be checked before the mast is removed. See Lift Chains Adjustment.

1. Fully lower all of the mast weldments. Tilt the mast fully forward. Connect a crane with a capacity of at least 907 kg (2000 lb) to the top of

the mast using chains to support the mast in an upright position when the tilt cylinders are disconnected.



WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

Completely lower forks to relieve hydraulic pressure before disassembling any part of the lift pump or disconnecting any hoses.

The hydraulic oil is hot at normal operating temperatures. Be careful when draining the oil.



CAUTION

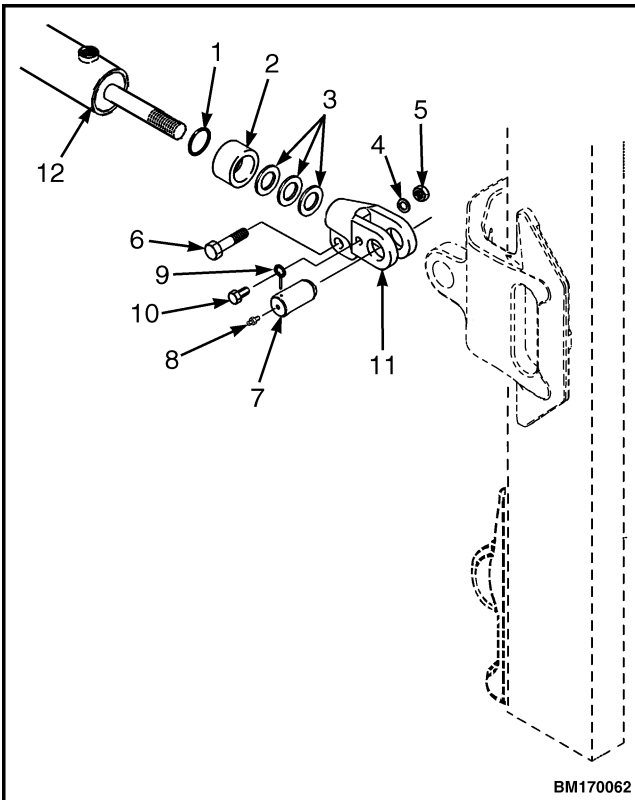
Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.

2. Position a drip pan with a capacity of 19 liter (5 gal) under the area of the hydraulic fittings. Disconnect the hydraulic line at the external lowering control valve on the outer mast.

WARNING

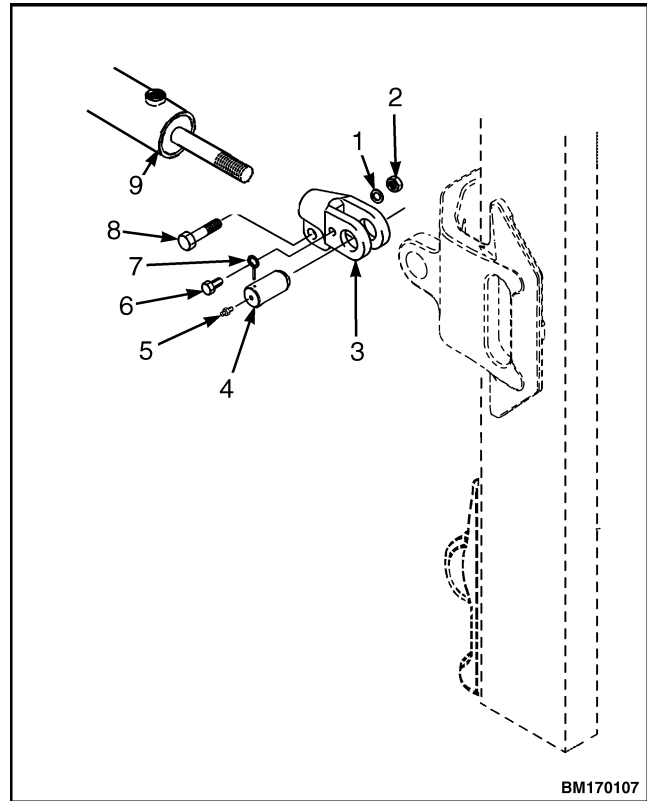
Use a driver, NOT your fingers, to push the anchor pins from the clevises on the tilt cylinders. The cylinder or mast can move and cause serious injury.

3. Remove the capscrews, washers, and anchor pins at the tilt cylinder mounts on the outer mast. See Figure 10, Figure 11, and Figure 12.



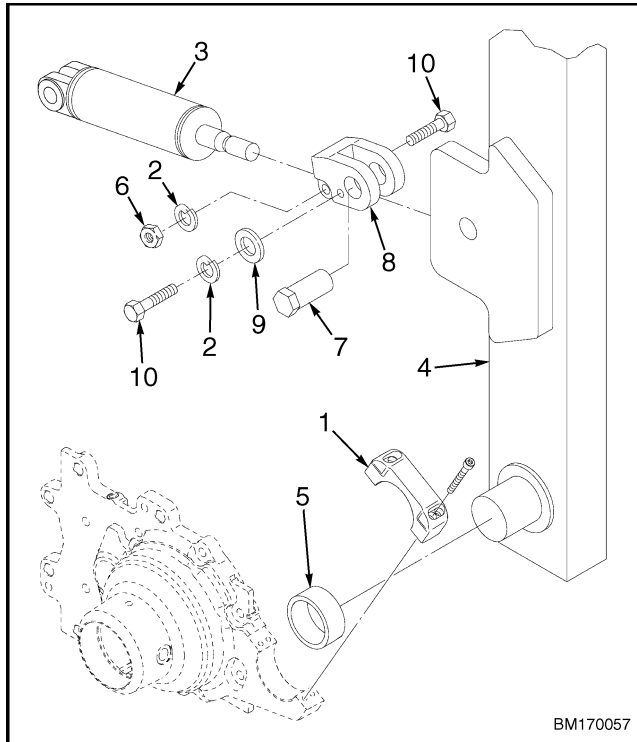
- | | |
|-------------|-------------------|
| 1. O-RING | 7. PIVOT PIN |
| 2. SPACER | 8. GREASE FITTING |
| 3. SHIMS | 9. RETAINER PIN |
| 4. WASHER | 10. CAPSCREW |
| 5. NUT | 11. ROD END |
| 6. CAPSCREW | 12. TILT CYLINDER |

Figure 10. Mast Mounting for Lift Truck Models S2.0-3.5FT (S40-70FT, S55FTS) (F187); H2.0-3.5FT (H40-70FT) (L177); J2.00-3.20XM (J40-65Z) (B416); and E2.00-3.20XM (E45-65Z) (G108)



- | | |
|-------------------|------------------|
| 1. WASHER | 6. CAPSCREW |
| 2. NUT | 7. RETAINER PIN |
| 3. ROD END | 8. CAPSCREW |
| 4. PIVOT PIN | 9. TILT CYLINDER |
| 5. GREASE FITTING | |

Figure 11. Mast Mounting for Lift Truck Models S30FT, S35FT, S40FTS (E010) and H1.6FT, H1.8FT, H2.0FTS (H30FT, H35FT, H40FTS) (F001)



1. RETAINER CAP
2. LOCKWASHER
3. TILT CYLINDER
4. OUTER MAST WELDMENT
5. BUSHING
6. NUT
7. PIN
8. ROD END
9. WASHER
10. CAPSCREW

**Figure 12. Mast Mounting for Lift Truck
Models J1.60-2.00XMT (J30-40ZT) [J160] and
E1.50-2.00XM (E25-35Z, E40ZS) (E114/F114)**

NOTE: Allow the mast to tilt forward enough to gain access to the mast mount capscrews.

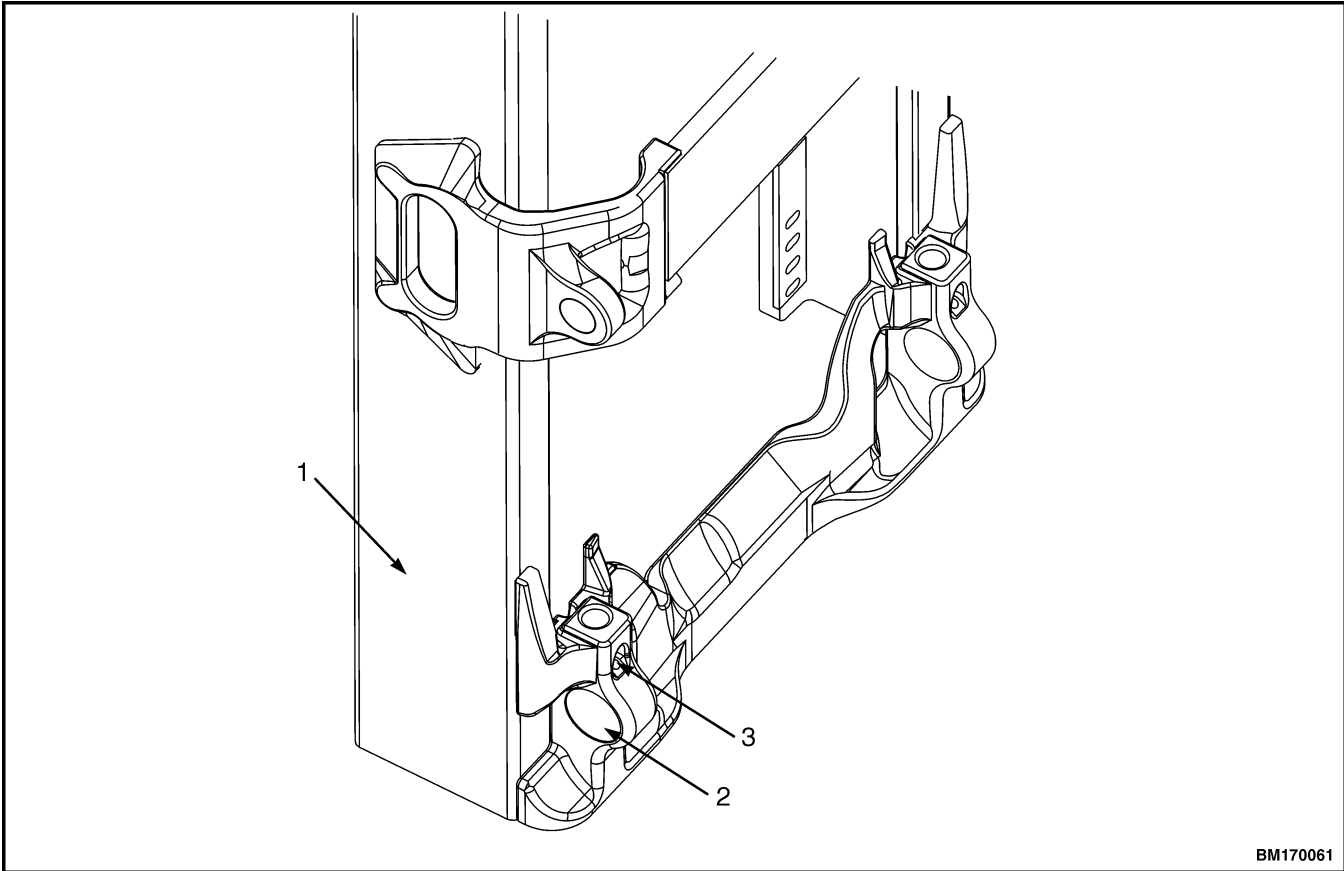
4. Disconnect the lower mast mounts from the lift truck:
 - a. Pivot Pin Connections - Remove the capscrews that hold the mast pivot pins to the mounts on the drive axle. See Figure 13 and Figure 14.
 - b. Stub Shaft Connections - Remove the four capscrews securing the retainer cap over the stub shafts on each side of the mast. See Figure 12.



WARNING

The mast is heavy. The mast can weigh approximately 907 kg (2000 lb). Make sure all lifting devices (hoists, cables, chains, slings, etc.) are suitable and of adequate capacity to lift the mast.

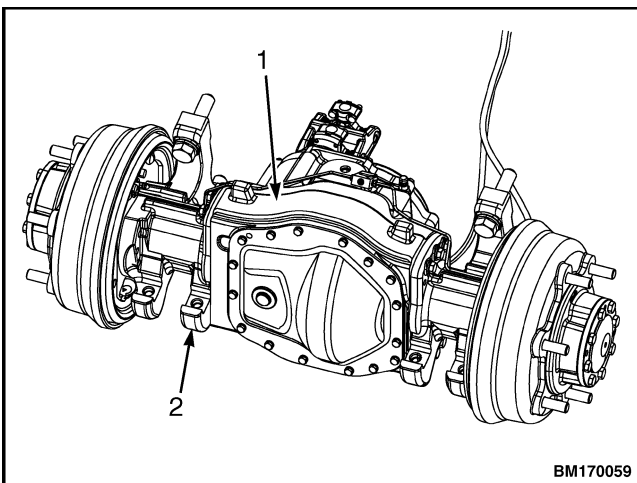
5. Use the crane to lift the mast assembly from the lift truck. Position the mast across wooden beams on the floor with the carriage side up.
6. Check the mast and mounting flanges for wear or damage:
 - a. Pivot Pin Connections - Remove the mast pivot pins from the outer mast. Check that the pins fit snug in the outer mast. If pins can be moved up and down a minimum of 4 mm (0.20 in.), replace bushings in outer mast and/or mast pivot pins as required. See Figure 16.
 - b. Stub Shaft Connections - Remove the bushing from the stub shaft. Check that the bushing fits snug over the stub shaft. Place the bushing into the drive unit mounts and place the retainer cap into position. Check that the bushing is snug under the retainer cap. If pins can be moved up and down a minimum of 4.0 mm (0.2 in.), replace bushings as required.



BM170061

- 1. OUTER MAST
- 2. BUSHING
- 3. GREASE FITTING

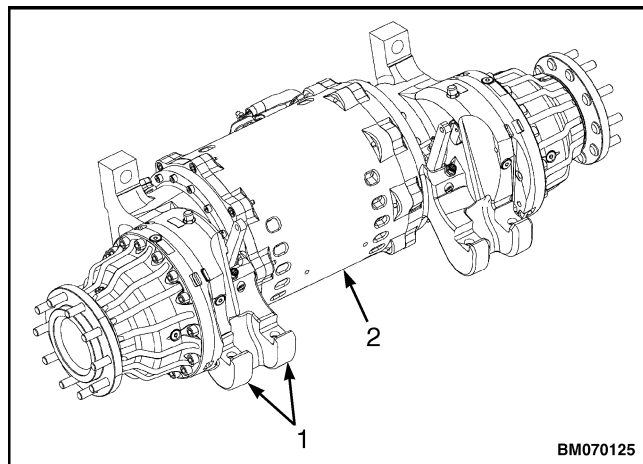
Figure 13. Mast Mounts, Outer Mast



BM170059

- 1. DRIVE AXLE
- 2. HANGER MOUNTS

Figure 14. Mast Mounts, Drive Axle



BM070125

- 1. HANGER MOUNTS
- 2. TRACTION MOTOR

Figure 15. Mast Mounting For Lift Truck Model J2.00-3.20XM (J40-65Z) (B416)

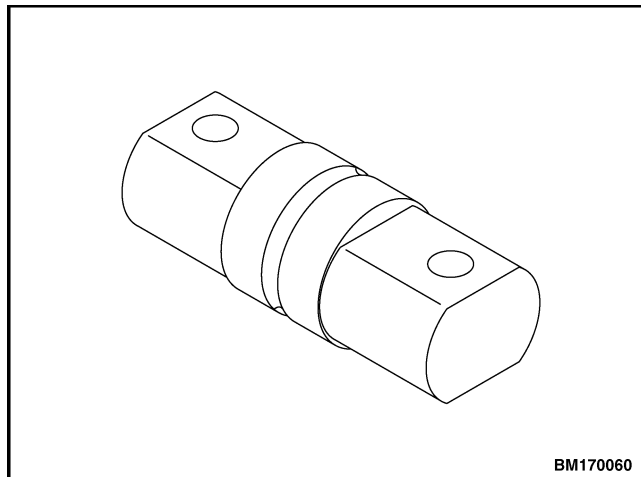


Figure 16. Mast Pivot Pin

TWO-STAGE LFL AND TWO-STAGE FFL MASTS, DISASSEMBLE

WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

Completely lower forks to relieve hydraulic pressure before disassembling any part of the lift pump or disconnecting any hydraulic hoses.

The hydraulic oil is hot at normal operating temperatures. Be careful when draining the oil.

CAUTION

Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.

NOTE: If the lift cylinders alone need to be removed and repaired, see the section **Cylinder Repair** 2100 SRM 1139. When the mast has header hoses, see Header Hose Arrangement.

1. Clean the area around the hydraulic fittings for the lift cylinders. Disconnect the fittings at the

lift cylinders and put caps on the open lines. See Figure 17 and Figure 18.

2. Remove the chains and header hoses. On the two-stage FFL mast, remove the brackets and disconnect the hydraulic line for the free-lift cylinder. Remove the free-lift cylinder. Disconnect the free-lift chains at the crossmember. See Figure 19 and Figure 20.

WARNING

Be careful when removing or installing snap rings. These snap rings can come loose during removal or installation with enough force to cause an injury. Always use the correct snap ring pliers, and wear eye and face protection during removal or installation.

3. Remove the nut, bolt, and spacer at the mount near the top of each main lift cylinder. Remove the snap rings and washers from the top of each main lift cylinder. Disconnect the main lift chains at the mounts. See Figure 17, Figure 18, Figure 19, and Figure 20.
4. On the two-stage FFL mast, disconnect the FFL supply tube and remove the hydraulic fitting from the top of the left- or right-hand main lift cylinder.

WARNING

The mast weldments can slide when the mast is moved. A weldment that slides can cause injury.

5. Slide the inner mast from the outer mast approximately 30 cm (12 in.) to disengage the main lift cylinders from the inner mast. Remove the main lift cylinders from the outer mast. See Figure 17, Figure 18, Figure 19, and Figure 20.
6. Slide the inner mast from the bottom of the outer mast approximately 30 cm (12 in.). Remove the strip bearings and load rollers from the top of the outer mast. Remove the load rollers from the bottom of the inner mast. Make a note of each shim arrangement and load roller location. The shim arrangements will be approximately the same during assembly.